ECOLOGY, EVOLUTION, AND ORGANISMAL BIOLOGY, BIOLOGICAL SCIENCES (BS)

Degree: Bachelor of Science
Major: Biological Sciences
Concentration: Ecology, Evolution, and Organismal Biology
Program Code: 3409

About This Major...

The Bachelor of Science degree with a Biological Sciences major provides a broad background in the biological sciences. Students choose biology courses from four categories: cellular, molecular, and developmental biology; anatomical and physiological biology; organismal biology; and ecology, evolution, and systematics. The Ecology, Evolution, and Organismal Biology Concentration will provide a solid background in ecology and evolution, and offers field courses in a variety of areas, in addition to internships and research opportunities. Graduates of this program may pursue careers in ecology, plant biology, fish and wildlife biology, and evolutionary biology, which are just a few of the career options available.

For more information on what you can do with this major, visit Career Services’ What to Do with a Major? resource.

All CMU baccalaureate graduates are expected to demonstrate proficiency in specialized knowledge/applied learning, quantitative fluency, communication fluency, critical thinking, personal and social responsibility, and information literacy. In addition to these campus-wide student learning outcomes, graduates of this major will be able to:

a. Demonstrate a broad, comprehensive knowledge of the main areas of biology (including evolution, diversity, ecology, cell biology, and genetics) and the ability to apply this knowledge to address new questions. (Specialized knowledge)
b. Collect and analyze quantitative data and interpret quantitative data presented in primary scientific literature. (Quantitative Fluency/ Applied Learning)
c. Utilize science as a way of thinking and problem solving and make key observations, ask questions, formulate hypotheses, design experiments, collect data, draw logical conclusions, and explain and defend those conclusions to others. (Critical Thinking)
d. Demonstrate effective biological communication skills, both in writing and orally. (Communication fluency)
e. Evaluate and defend contrasting viewpoints related to ethical, social, civic, and/or environmental challenges in the field of biological sciences. (Personal Social Responsibility)
f. Critically search, evaluate, and appropriately apply information from primary scientific literature (Information Literacy)

Requirements

Each section below contains details about the requirements for this program. Select a header to expand the information/requirements for that particular section of the program’s requirements.

To print or save an overview of this program’s information, including the program description, learning outcomes, requirements, suggested course sequencing (if applicable), and advising and graduation information, scroll to the bottom of the left-hand navigation menu and select “Print Options.” This will give you the options to either “Send Page to Printer” or “Download PDF of This Page.” The “Download PDF of This Page” option prepares a much more concise presentation of all program information. The PDF is also printable and may be preferable due to its brevity.

Institutional Degree Requirements

The following institutional degree requirements apply to all CMU baccalaureate degrees. Specific programs may have different requirements that must be met in addition to institutional requirements.

- 120 semester hours minimum.
- Students must complete a minimum of 30 of the last 60 hours of credit at CMU, with at least 15 semester hours in major discipline courses numbered 300 or higher.
- 40 upper-division credits (an alternative credit limit applies to the Bachelor of Applied Science degree).
- 2.00 cumulative GPA or higher in all CMU coursework.
- A course may only be used to fulfill one requirement for each degree/ certificate.
- No more than six semester hours of independent study courses can be used toward the degree.
- Non-traditional credit, such as advanced placement, credit by examination, credit for prior learning, cooperative education and internships, cannot exceed 30 semester credit hours for a baccalaureate degree. A maximum of 15 of the 30 credits may be for cooperative education, internships, and practica.
- Pre-collegiate courses (usually numbered below 100) cannot be used for graduation.
- Capstone exit assessment/projects (e.g., Major Field Achievement Test) requirements are identified under Program-Specific Degree Requirements.
- The Catalog Year determines which program sheet and degree requirements a student must fulfill in order to graduate. Visit with your advisor or academic department to determine which catalog year and program requirements you should follow.
- See “Requirements for Undergraduate Degrees and Certificates” in the catalog for a complete list of graduation requirements.

Essential Learning Requirements

(31 semester hours)

See the current catalog for a list of courses that fulfill the requirements below. If a course is an Essential Learning option and a requirement for your major, you must use it to fulfill the major requirement and make a different selection for the Essential Learning requirement.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 111</td>
<td>English Composition I-GTCO1</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 112</td>
<td>English Composition II-GTCO2</td>
<td>3</td>
</tr>
<tr>
<td>MATH 113</td>
<td>College Algebra-GTMA1</td>
<td>3</td>
</tr>
<tr>
<td>History</td>
<td>Select one History course</td>
<td>3</td>
</tr>
<tr>
<td>Humanities</td>
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</tbody>
</table>
Select one Humanities course  

Social and Behavioral Sciences  
Select one Social and Behavioral Sciences course  
Select one Social and Behavioral Sciences course  

Fine Arts  
Select one Fine Arts course  

Natural Sciences  
CHEM 131 General Chemistry I-GTSC1 and General Chemistry Laboratory I-GTSC1  
CHEM 132 General Chemistry II-GTSC1 and General Chemistry Laboratory II-GTSC1  

Total Semester Credit Hours 31

1 Must receive a grade of "C" or better and must be complete by the time the student has 60 semester hours.
2 This is a 4 credit course. 3 credits apply to the Essential Learning requirements and 1 credit applies to elective credit. Also, professional schools (medical, veterinary, dental) may require one semester or two semesters of calculus. MATH 151 and MATH 152 may be used to fulfill the Mathematics requirement. If Math higher than MATH 113 is needed, an ALEKS Math placement test will determine the appropriate Math course.
3 CHEM 131/131L and CHEM 132/132L are 5 credit hours each for a total of 10 semester hours. 7 credit hours will apply to Essential Learning Natural Sciences and 3 credit hours will apply to electives.

Program Specific Degree Requirements  
(56 semester hours, must pass all courses with a grade of "C" or higher)

- Topics courses (BIOL 196/BIOL 296/BIOL 396/BIOL 496) as well as research courses (BIOL 387/BIOL 487), internships (BIOL 493), and independent study (BIOL 495) may not be used as Additional Biology Courses but must be used for elective credit.

Foundation Courses  
(7-9 semester hours, must pass all courses with a grade of "C" or higher. Foundation courses should be completed by the end of the sophomore year.)

MATH 151 Calculus I-GTMA1  

Total Semester Credit Hours 7-9

1 A higher-level subject may be taken in the same category with advisor approval. Organic Chemistry may be required for admission to some graduate programs.
2 Statistics and Calculus may be required for admission to some graduate programs. If MATH 151 is needed, an ALEKS Math Placement test will determine the appropriate Math course.

Program Specific Degree Requirements  
(56 semester hours, must pass all courses with a grade of "C" or higher)

- Topics courses (BIOL 196/BIOL 296/BIOL 396/BIOL 496) as well as research courses (BIOL 387/BIOL 487), internships (BIOL 493), and independent study (BIOL 495) may not be used as Additional Biology Courses but must be used for elective credit.

Code Title Semester Credit Hours

Core Courses  
BIOL 208 & 208L Fundamentals of Ecology and Evolution and Fundamentals of Ecology and Evolution Laboratory 4
BIOL 301 & 301L Principles of Genetics and Principles of Genetics Laboratory 4
BIOL 483 Senior Thesis 2

Required Related Study Area  
PHYS 111 General Physics-GTSC1 and General Physics Laboratory-GTSC1 5
PHYS 112 General Physics II-GTSC1 and General Physics II Laboratory-GTSC1 5
BIOL 105 & 106L Principles of Animal Biology and Principles of Animal Biology Laboratory 4
BIOL 107 & 107L Principles of Plant Biology and Principles of Plant Biology Laboratory 4
BIOL 403 Evolution 3
BIOL 405 Advanced Ecological Methods 5

Additional Biology Courses  
Select 20 semester hours, chosen from the lists below. At least 16 hours must be 300-level or above.

Category 1: Cellular, Developmental, and Molecular  
BIOL 302 Cellular Biology  
BIOL 310 Developmental Biology and Developmental Biology Laboratory  
BIOL 343 Immunology  
BIOL 344 Forensic Molecular Biology and Forensic Molecular Biology Laboratory  
BIOL 371L Laboratory Investigations in Cellular and Molecular Biology  
BIOL 425 Molecular Genetics  
BIOL 442 Pharmacology  

Other Lower Division Requirements  

Code Title Semester Credit Hours

Wellness Requirement  
KINE 100 Health and Wellness 1
Select one Activity course 1

Essential Learning Capstone  
ESSL 290 Maverick Milestone 3

Total Semester Credit Hours 6

1 Essential Learning Capstone must be taken after completion of the Essential Learning English and Mathematics requirements, and when a student has earned between 45 and 75 hours.
CHEM 316  Biochemistry II
CHEM 317L  Biochemistry Laboratory

Category 2: Organismal
BIOL 250  Introduction to Microbiology-GTSC1
& 250L  and Introduction to Microbiology Laboratory-GTSC1
BIOL 316  Animal Behavior
& 316L  and Animal Behavior Laboratory
BIOL 322  Plant Identification
& 322L  and Plant Identification Laboratory
BIOL 331  Insect Biology
& 331L  and Insect Biology Laboratory
BIOL 333  Marine Biology
BIOL 335  Invertebrate Zoology
& 335L  and Invertebrate Zoology Laboratory
BIOL 336  Fish Biology
& 336L  and Fish Biology Laboratory
BIOL 338  Small Mammal Biology
BIOL 350  Microbiology
& 350L  and Microbiology Laboratory
BIOL 411  Mammalogy
& 411L  and Mammalogy Laboratory
BIOL 412  Ornithology
& 412L  and Ornithology Laboratory
BIOL 413  Herpetology
& 413L  and Herpetology Laboratory
BIOL 431  Animal Parasitology
& 431L  and Animal Parasitology Laboratory
BIOL 450  Mycology
& 450L  and Mycology Laboratory

Category 3: Anatomical and Physiological
BIOL 209  Human Anatomy and Physiology
& 209L  and Human Anatomy and Physiology Laboratory
BIOL 210  Human Anatomy and Physiology II
& 210L  and Human Anatomy and Physiology II Laboratory
BIOL 241  Pathophysiology
BIOL 351  Ecological Physiology
& 351L  and Ecological Physiology Laboratory
BIOL 352  Human Physiology
& 352L  and Human Physiology Laboratory
BIOL 409  Gross and Developmental Human Anatomy
& 409L  and Gross and Developmental Human Anatomy Laboratory
BIOL 410  Human Osteology
& 410L  and Human Osteology Laboratory
BIOL 421  Plant Physiology
& 421L  and Plant Physiology Laboratory
BIOL 423  Plant Anatomy
& 423L  and Plant Anatomy Laboratory
BIOL 441  Endocrinology

Category 4: Ecology, Evolution, and Systematics
BIOL 211  Ecosystem Biology
& 211L  and Ecosystem Biology Laboratory
BIOL 315  Epidemiology
BIOL 320  Plant Systematics
BIOL 321  Taxonomy of Grasses
& 321L  and Taxonomy of Grasses Laboratory
BIOL 406  Plant-Animal Interactions
BIOL 407  Tropical Field Biology
BIOL 408  Desert Ecology
BIOL 414  Freshwater Ecology
& 414L  and Freshwater Ecology Laboratory
BIOL 415  Tropical Ecosystems
BIOL 418  Wildlife Management
& 418L  and Wildlife Field Techniques
BIOL 419  Fisheries Management
& 419L  and Fisheries Management Laboratory
BIOL 420  Conservation Biology
GIST 305  Cartography for GIS
GIST 332  Introduction to Geographic Information Systems
& 332L  and Introduction to Geographic Information Systems Laboratory
GEOG 131  Introduction to Cartography

Total Semester Credit Hours 56

General Electives
All college level courses appearing on your final transcript, not listed above that will bring your total semester hours to 120 hours, including 40 upper-division hours. 18-20 semester hours; up to 10 hours of upper division may be needed. BIOL 499 Internship or research courses are recommended.

Code  Title  Semester Credit Hours
MATH 113  College Algebra-GTMA1  1
CHEM 131  General Chemistry I-GTSC1  1
& 131L  and General Chemistry Laboratory I-GTSC1
CHEM 132  General Chemistry II-GTSC1  2
& 132L  and General Chemistry Laboratory II-GTSC1

14-16 General Elective Semester Hours 14-16

Total Semester Credit Hours 18-20

Suggested Course Plan

First Year
Fall Semester  Semester Credit Hours
BIOL 105  Attributes of Living Systems-GTSC1  4
& 105L  and Attributes of Living Systems Laboratory-GTSC1
CHEM 131  General Chemistry I-GTSC1  5
& 131L  and General Chemistry Laboratory I-GTSC1
MATH 113  College Algebra-GTMA1  4
KINE 100  Health and Wellness  1

Spring Semester  Semester Credit Hours
BIOL 106  Principles of Animal Biology  4
& 106L  and Principles of Animal Biology Laboratory
CHEM 132  General Chemistry II-GTSC1  5
& 132L  and General Chemistry Laboratory II-GTSC1
ENGL 111  English Composition I-GTC01  3
in planning courses and altering the suggested course sequencing. It is ultimately the student's responsibility to understand and fulfill the requirements for her/his intended degree(s).

DegreeWorks is an online degree audit tool available in MAVzone. It is the official record used by the Registrar's Office to evaluate progress towards a degree and determine eligibility for graduation. Students are responsible for reviewing their DegreeWorks audit on a regular basis and should discuss questions or concerns with their advisor or academic department head. Discrepancies in requirements should be reported to the Registrar's Office.

Graduation Process

Students must complete the following in the first two months of the semester prior to completing their degree requirements:

- Review their DegreeWorks audit and create a plan that outlines how unmet requirements will be met in the final semester.
- Meet with their advisor and modify their plan as needed. The advisor must approve the final plan.
- Submit the “Intent to Graduate” form to the Registrar's Office to officially declare the intended graduation date and commencement ceremony plans.
- Register for all needed courses and complete all requirements for each degree sought.

Submission deadlines and commencement details can be found at [http://www.coloradomesa.edu/registrar/graduation.html](http://www.coloradomesa.edu/registrar/graduation.html).

If a student's petition for graduation is denied, it will be her/his responsibility to consult the Registrar's Office regarding next steps.

Advising and Graduation
Advising Process and DegreeWorks

Documentation on the pages related to this program is intended for informational purposes to help determine what courses and associated requirements are needed to earn a degree. The suggested course sequencing outlines how students could finish degree requirements. Some courses are critical to complete in specific semesters, while others may be moved around. Meeting with an academic advisor is essential.